Avoiding Major Program Performance Failures

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Avoiding Major Program Performance Problems:

Implementing Project Management in Software Development Applications

presented by:

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ROBERT NEUBECKER

IT'S LATE, COSTLY, INCOMPETENT —BUT TRY FIRING A COMPUTER SYSTEM

Companies get stuck with 'runaways' that trample all over their budgets and reputations

It's a project that, for Allstate Insurance Co., has redefined the concept of sparing no expense. The Sears, Roebuck & Co. subsidiary set out in 1982 to build the insurance industry's most sophisticated computer system, one that would make its competitors quake. The system was supposed to automate Allstate's office operations and shorten the normal three-year period needed to introduce new types of policies to one month. Allstate hired Electronic Data Systems Corp., the systems-integration company, to develop the software and help install it on the firm's hardware. The target date for completion was December, 1987; the target cost was $8 million. Some $15 million later, Allstate has a new project consultant, a new deadline, and a new cost estimate: $100 million.

The Allstate case is a classic example of a computer runaway, a system that's millions over budget, years behind schedule, and—if ever completed—less effective than promised. A recent Peat Marwick Mitchell & Co. survey of 600 of the accounting firm's largest clients highlighted the problem: Some 35% currently have major runaways. Indeed, experts say, such diverse systems integrators as the Big Eight accounting firms, computer suppliers, and even in-house data processing staffs are fast building a record of mediocrity. Says James A. Willbern, a management consultant at Peat Marwick: The industry's "ability to install systems is pretty crummy."

The problem is so acute that it has created a lucrative industry of its own. In 1986, Willbern set up a group at Peat Marwick to rein in runaways. Since then, he has had $30 million in revenues from nearly 20 clients, including Allstate.

BLOWN DEADLINES. Allstate's project ran on track for about a year before it went awry. First, deadlines for programming and for testing hardware started slipping by. Then Allstate technical staffers quarreled over the dimensions of the project and each other's roles. By 1987, the huge project had changed from savior to albatross, and Allstate had had enough. It started over with Peat Marwick, which helped revamp and train the in-house staff working on the system, now targeted for completion in 1993.

Although there are many explanations for the epidemic of runaways, there seems to be a common thread: Neither buyers nor builders of computer systems have adjusted their deadlines to reflect the increased complexity of computer projects. A decade ago, a $2 million computer system that took longer than a year to build was a rarity. Such systems were self-contained units with no interweaving of technologies and data bases. Connectivity was a foreign word. Today, although companies are developing systems of such magnitude that entire businesses are sculpted around them, many designers still use the old approach. Far better, consultants say, is to divide major projects into modules that can be finished one at a time.

"It's the difference between counting the number of people in a small room and doing a U. S. census," says Wayne Stevens, a leading systems-design theorist. "It takes two different skills, and when you go from the simpler to the more complex project, you'd better do things differently."

Tom Hefty learned this the hard way when a runaway carried Blue Cross & Blue Shield United of Wisconsin to the brink of disaster. In 1983, three years before Hefty became chief executive of the Milwaukee-based insurer, it hired EDS to build a $200 million system to coordinate all the services then being handled by five computers. The system was completed on time—in just 18 months. But it didn't work. One example: Because of an entry error, the computer sent out hundreds of checks to the

fictitious hamlet of None, Wis. A month later the checks arrived back at Blue Cross for readdressing. During its first year, the system disbursed $60 million in overpayments or duplicate checks.

Before the runaway was stopped, Blue Cross lost 35,000 members—a setback it attributes to the computer problems. EDS contends foul-ups were inevitable because of the multitude of data to be converted from the old system to the new. But Blue Cross wants EDS to reimburse it for some of the lost revenues. The dispute is now in arbitration.

Inheriting this mess in 1986, Hefty immediately instituted tough quality-control measures. He found that the system's developers never adequately used checkpoints during the project to evaluate whether the system was on track. Only that, he says, would have ensured a more successful outcome. Others concur. "In larger projects, you should have a detailed review every 12 months," says Jack Epstein, a vice-president at the research firm International Data Corp. "In shorter-term projects, you could meet every six months. These meetings, Hefty adds, should include senior management. Most nontechnical executives are unwilling to take an active role in developing a computer system—until costs spiral out of control. "I let it slip, that's the problem," says the president of a medical diagnostic firm. "I kept hands off, and it hurt me in the end."

'PROMISING EVERYTHING.' This company experienced a nightmare last year when its new computer system, during its first day in operation, lost information pertaining to thousands of crucial medical tests. The software couldn't handle the volumes of data it had to deal with. Luckily, the loss was not permanent—but it took 30 days to reconstruct the records. At that point, the company's president decided to "take a clean look at this thing." He fired the data processing chief, hired a new technical staff, and announced that he would be closely involved with all future systems development. A new system is expected to be completed by the end of this year.

One problem with giving data processing professionals and outside suppliers free rein over a new computer system is that they tend to be overly optimistic: "They sell expectation, not reality," says Dave Elenburg, who last year led a group that cleaned up a multimillion-dollar runaway in the workers' compensation system in Oklahoma. "Pers feel they have to keep the executives happy by promising even what they can't deliver. And suppliers are out for sales."

One common gripe among customers is that after they hire a supplier to direct the development of a system, the work is frequently assigned to "students straight out of tech school," as Elenburg puts it. The more talented professionals who represented the supplier in the initial meetings are busy trying to bring in new business. Robert C. Bobb, city manager of Richmond, Va., was so incensed two years ago when Arthur Young sent inexperienced technicians to develop the management system for the city's utilities that he now writes into all consulting contracts the names of the people who must work on the project. Arthur Young says that its senior consultants were "heavily involved" in the Richmond project. But Bobb says that's not enough: "The partners have to begin to do the grunt work."

DISMAL PICTURE. So do the people who ultimately will use the system. Too often, a runaway occurs because during the planning stages the staffers who eventually will be operating the computers are not consulted for ideas about how the system should work. "User involvement cannot be casual," says George Hathaway, a runaway-buster at the Index Group, a Cambridge (Mass.) consultancy. "The mind-set has to be emphasized more to users that the computer works for you; you don't work for it."

As dismal as the picture is, there are glimmers of light. Many runaway consultants feel that the recent round of failures has taught buyers caution. "Corporate executives are becoming very wary about dropping millions of dollars into a bottomless bucket," says Phil Dressler, a Dallas-based runaway salvager. Moreover, Dressler adds, as such executives become more computer-literate over the next few years, they will be less afraid to take charge of technical projects. And data processing professionals are becoming better managers, increasingly using the modular approach to building systems. What's more, unyielding competition in the $5 billion-a-year systems-integration field will sooner or later force the companies in it to be more attentive to customers' needs or be losers in a booming market.

These trends are cause for hope. But until they spread, it seems inevitable that millions more will be squandered on computer systems that fail to work or even to see the light of day.

By Jeffrey Rothfeder in New York

A SAMPLING OF 'RUNAWAY' PROJECTS

ALLSTATE INSURANCE In 1982, with software from Electronic Data Systems, the insurer began to build an $8 million computer system that would automate it from top to bottom. Completion date: 1987. An assortment of problems developed, delaying completion until 1993. The new estimated price: $100 million

CITY OF RICHMOND In 1984 it hired Arthur Young to develop a $1.2 million billing and information system for its water and gas utilities. Completion date: March, 1987. After paying out close to $1 million, Richmond recently canceled the contract, saying no system had been delivered. Arthur Young has filed a $2 million breach of contract suit against the city

BUSINESS MEN'S ASSURANCE In 1985 the reinsurer began a one-year project to build a $500,000 system to help minimize the risk of buying insurance policies held by major insurers. The company has spent nearly $2 million to date on the project, which is in disarray. The new completion date is early 1990

STATE OF OKLAHOMA In 1983 it hired a Big Eight accounting firm to design a $500,000 system to handle explosive growth in workers' compensation claims. Two years and more than $2 million later, the system still didn't exist. It finally was finished last year at a price of nearly $4 million

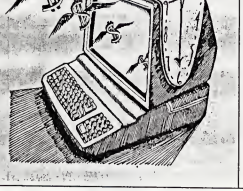
BLUE CROSS & BLUE SHIELD UNITED OF WISCONSIN In late 1983 it hired Electronic Data Systems to build a $200 million computer system. It was ready 18 months later—on time. But it didn't work. The system spewed out some $60 million in overpayments and duplicate checks before it was harnessed last year. By then, Blue Cross says, it had lost 35,000 policyholders

DATA: BW

HOW TO KEEP A PROJECT UNDER CONTROL

- Before designing the system, get suggestions from the people who will use it
- Put senior, nontechnical management in charge of the project to help ensure that it is finished on time and within budget
- Set up 12-month milestones—interim deadlines for various parts of the project
- Insist on performance clauses that hold suppliers legally responsible for meeting deadlines
- Don't try to update the system in midstream, before the original plan is finished

DATA: BW

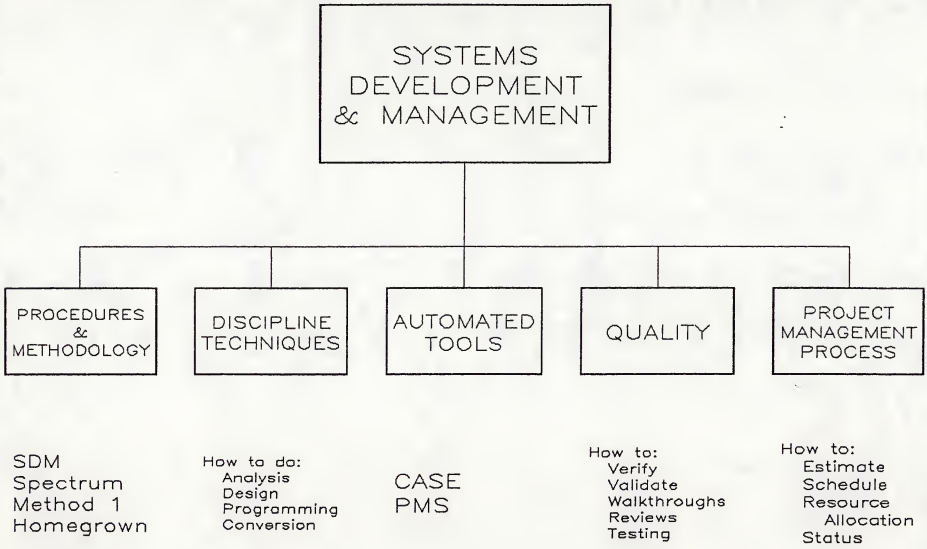


CARY BARTHOLOMEW

"Information systems are becoming synonymous with business goals, in many industries."

Donna Berman
Dir. of Marketing
Index Technologies, Inc

FIVE FACETS OF SYSTEMS DEVELOPMENT & MANAGEMENT



"My view is that most projects are in trouble before they get off the ground."

Victor Riden
Consultant

CAUSES OF RUNAWAY SOFTWARE DEVELOPMENT PROJECTS

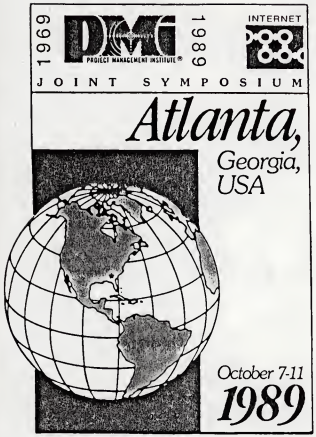
1. Delivery Dates Mandated by Management
2. "Not an Acceptable Number"
3. Adjustments to Scope
4. Poor Estimating Methods
5. Lack of Control
6. Lack of Sponsor Participation
7. Inadequate Staffing

"Let's be frank ..... An overrun of 1000 percent doesn't come as a surprise. Somebody made the decision to proceed in spite of the high cost, and it is unlikely that better precision in the estimates would have stopped such a calamity. Someone was afraid to admit the obvious."

Fred Forman – Vice President
American Management Systems

HOW PROGRAM CONTROL BENEFITS THE SOFTWARE DEVELOPMENT PROCESS

1. Risk Reduction in Planning
2. Management Acceptance
3. Early Regression Analysis
4. Controlling the Developer's Activities
5. Configuration Control of Modules



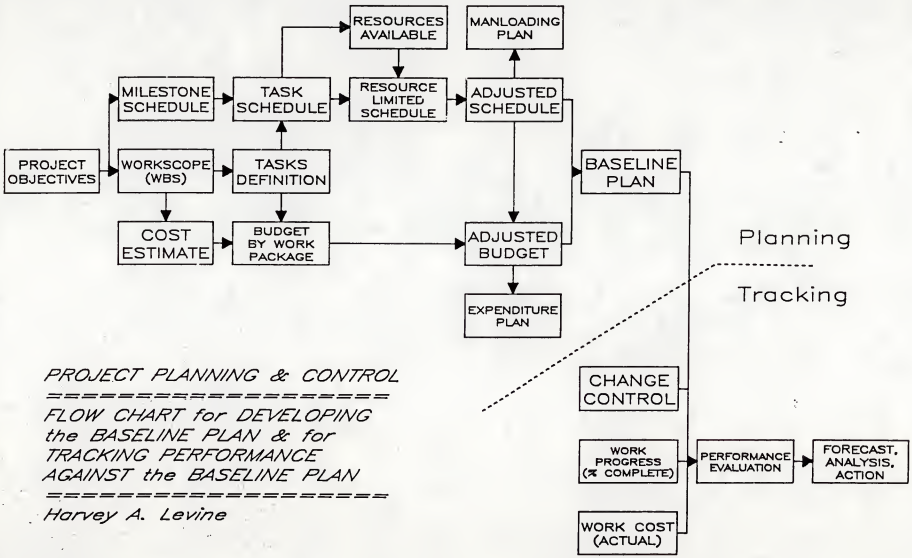
PROJECT MANAGEMENT

THE
INTERNATIONAL
LANGUAGE

Project Management Institute
Seminar/Symposium

1989
PROCEEDINGS

Implementing Project Management in the Software Development Industry



PROJECT PLANNING & CONTROL

FLOW CHART for DEVELOPING the BASELINE PLAN & for TRACKING PERFORMANCE AGAINST the BASELINE PLAN

Harvey A. Levine

DEFINING PROJECT OBJECTIVES

DEFINE PROJECT OBJECTIVES

- DELIVERABLES
- TIME
- BUDGET

DEVELOP PROJECT STRATEGY

- OPPORTUNITIES
- THREATS
- ISSUES
- STAKEHOLDER ANALYSIS

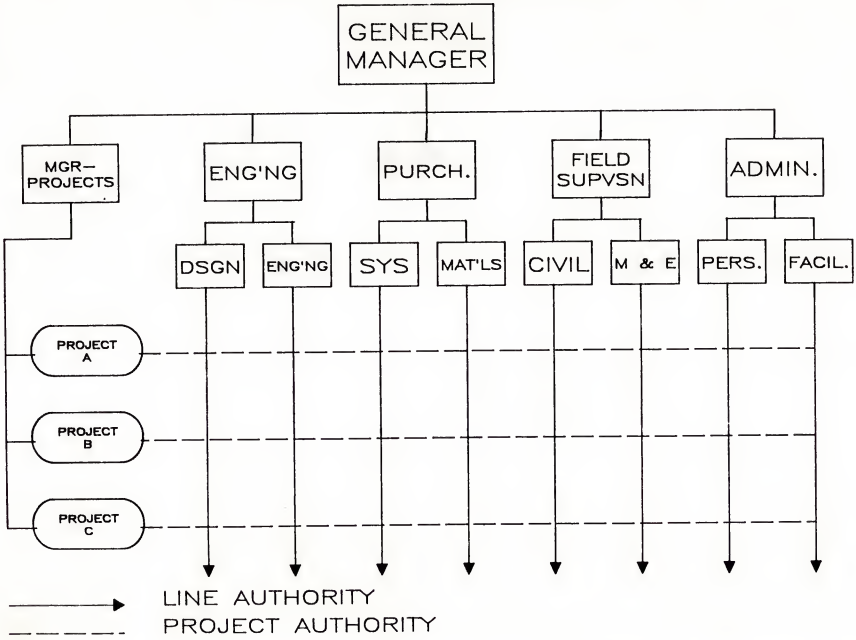
CLARIFY PROJECT ORGANIZATION

- FUNCTIONAL
- PROJECT
- MATRIX

OBTAIN PROJECT TEAM AGREEMENT

- PROJECT TEAM "BUYS-OFF" ON STRATEGY

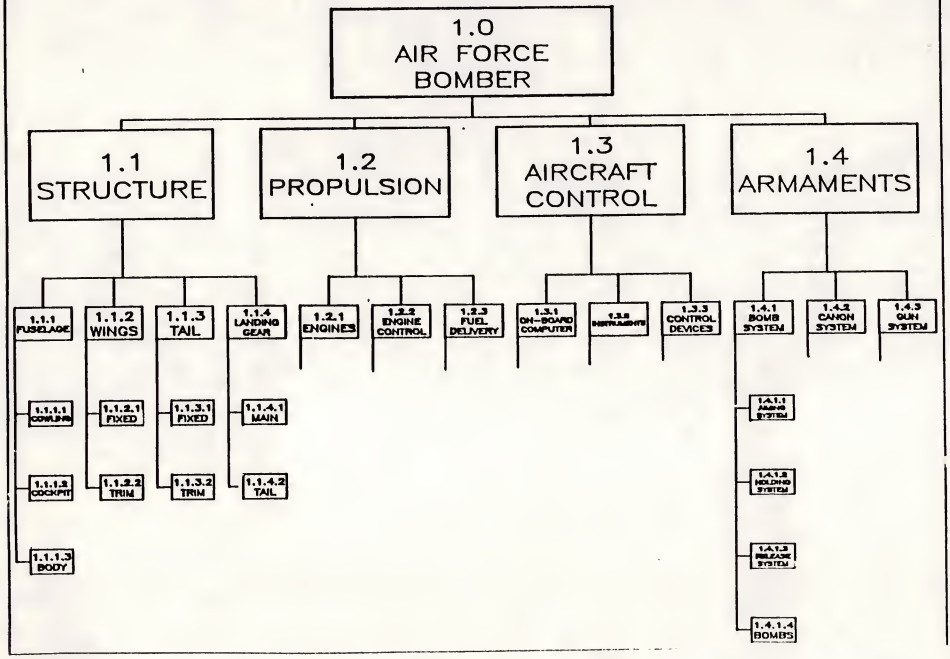
A MATRIX ORGANIZATION



"A Framework for managing the systems development process is required."

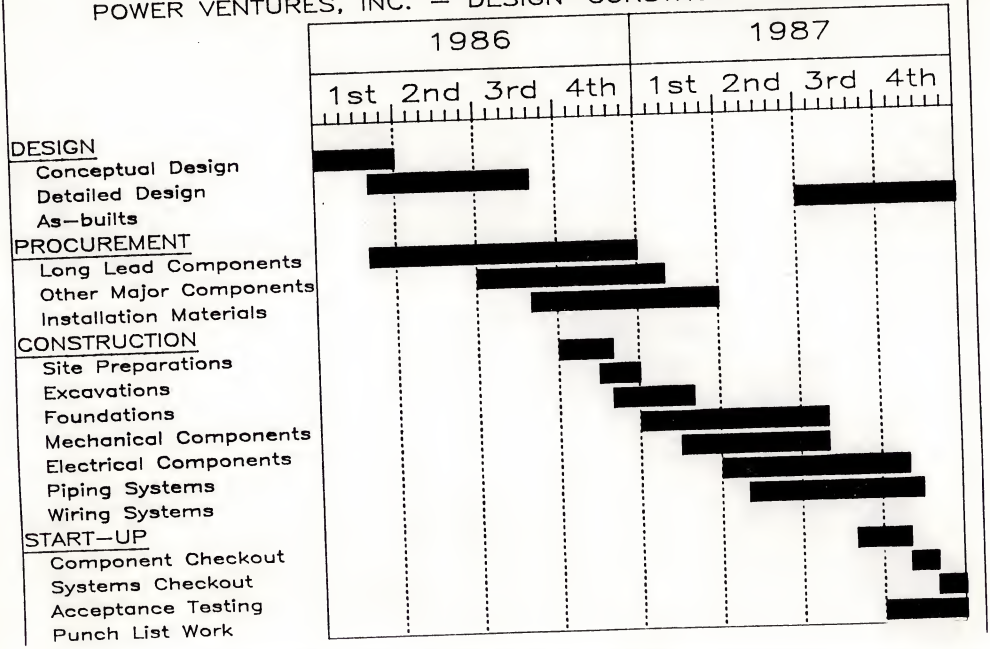
Arthur Andersen & Co.
Foundation
Method/1 module

WORK BREAKDOWN STRUCTURE



PROJECT MILESTONE SCHEDULE

POWER VENTURES, INC. — DESIGN—CONSTRUCT PROJECT



TASK DEFINITION

* Expected Product

* How does anyone know that the task has been completed?

* A clear understanding of the task

TIME ESTIMATING

* * *

(OR "HOW LONG DOES IT TAKE TO CATCH A FISH?)

---

* ELAPSED TIME VS. ACTUAL TIME

* TASK TIME VS. RESOURCE TIME

* INTERFACE LOSSES & DELAYS

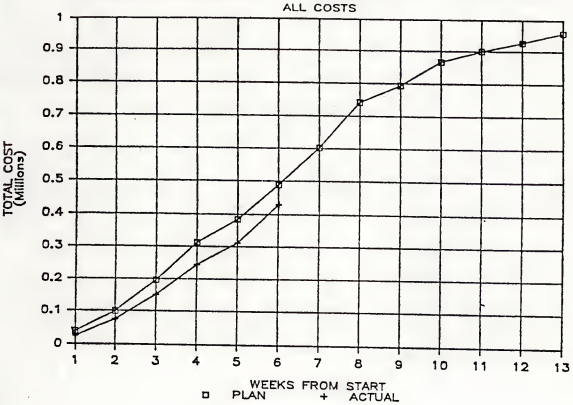
* THEORETICAL DURATION VS. EXPERIENCE

* SKILL LEVELS

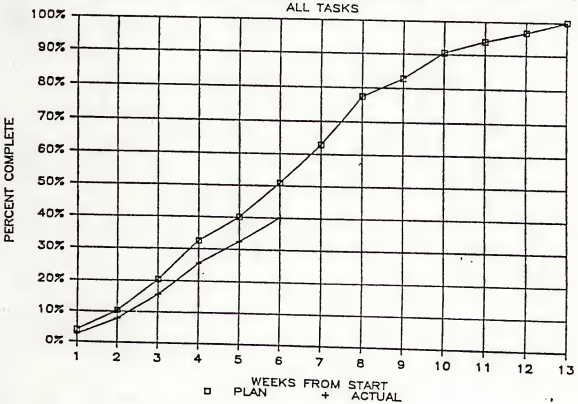
* LEARNING CURVE (PRODUCT/PROCESS NEWNESS)

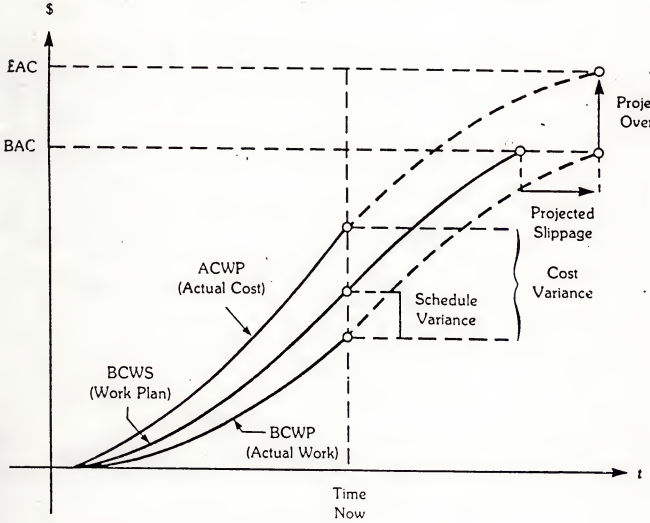
* PRIORITY
  (ASSIGN HIGHER PRIORITY TO HIGHER RISK)

PROJECT COST – PLAN vs. ACTUAL



PROJECT PROGRESS – PLAN vs. ACTUAL




$
EAC
BAC
Projected
Overrun
Projected
Slippage
Cost
Variance
ACWP
(Actual Cost)
Schedule
Variance
BCWS
(Work Plan)
BCWP
(Actual Work)
t
Time
Now

CRITERIA FOR PROJECT MANAGEMENT SOFTWARE FOR SOFTWARE DEVELOPMENT PROJECTS

1. PM SOFTWARE MUST BE ABLE TO SCHEDULE IN HOURLY, DAILY, AND WEEKLY TIME INCREMENTS.

2. CRITICAL PATH SCHEDULING IS REQUIRED, BUT NON-NETWORKED ACTIVITIES MUST BE HANDLED BY THE PROGRAM.

3. MUST HAVE COST AND SCHEDULE INTEGRATION.

4. TIME-PHASED QUANTITY AND COST/BUDGET REPORTING, AND EARNED VALUE COST TRACKING ARE IMPORTANT. SHOULD TRACK BCWS, BCWP, ACWP, AND ETC IN MONTHLY TIME FRAMES.

5. NEED RESOURCE SUMMARIZATION IN REPORT AND ON-SCREEN FORMATS.

6. MUST BE ABLE TO ESTABLISH A CONTRACT BASELINE AND MEASURE PROGRESS AGAINST THE BASELINE.

7. MUST BE ABLE TO ESTABLISH A RESOURCE LIBRARY FOR MULTIPLE PROJECTS, AND DO MULTI-PROJECT RESOURCE LEVELING.

8. REQUIRE FLEXIBLE GRAPHICAL OUTPUTS, ESPECIALLY FOR BAR CHARTS AND PERFORMANCE MEASUREMENTS. PREFER TO BE ABLE TO GET SOME OF THESE IN 8+ X 11 FORMAT, FOR USE IN OVERHEAD PROJECTORS.

9. NEED TO BE ABLE TO INTERFACE WITH OTHER SOFTWARE, VIA IMPORT/EXPORT CAPABILITIES. INTEGRATED DATABASE MANAGEMENT SYSTEM WOULD BE A PLUS

10. MUST BE ABLE TO PERFORM "WHAT-IF" ANALYSES WITHOUT DESTROYING ORIGINAL PLAN.

11. PROVIDE SOME MEANS OF ALLOWING USERS TO DESIGN THEIR OWN REPORT FORMATS, AT LEAST TO ALLOW SELECTION AND LOCATION OF DATA FIELDS. PROVIDE CAPABILITY FOR SORTING AND SELECTING DATA (FOR EXCEPTION REPORTING) AND FOR SUMMARIZATION (FOR MANAGEMENT REPORTING).

12. AN ALTERNATE RESOURCE CAPABILITY WOULD BE NICE, BUT NOT ESSENTIAL.

13. VENDOR SUPPORT IS CRITICAL. NEED TIMELY SUPPORT, TRAINING AND GOOD DOCUMENTATION. VENDOR SHOULD PROVIDE REGULAR UPGRADES. SHOULD BE ACTIVE USER GROUP, PREFERABLY RUN BY THE USERS.

14. ACCEPTANCE OF OUT OF SEQUENCE PROGRESS.

15. PROJECT PRIORITIZATION IN A MULTI-PROJECT ENVIRONMENT.

Resource Assignment

Assign as:

1. Amount per task
2. Amount per time unit per task
3. Percentage of an individual's availability

Examples:

1. 120 hours (total for task)
2. 4 hours per day over task duration
3. 50% of Jill's availability

HOW TO SPECIFY, EVALUATE & SELECT PROJECT MANAGEMENT SOFTWARE

- Determine your Project Management Methods
- Determine your PM Software Needs
- Develop the PM Software Specification
- Develop a List of Candidate Products
- Evaluate the Preliminary Alternative Set
- Evaluate the Final Alternative Set
- Make the Final Selection & Purchase

DETERMINE YOUR PROJECT MANAGEMENT METHODS

- IDENTIFY PROJECT MANAGEMENT STAKEHOLDERS
- PUT TOGETHER AN EVALUATION TEAM
- IDENTIFY SYSTEM INTERFACES
- GATHER INFORMATION
- HOLD WORKSHOPS & BRAINSTORMING SESSIONS
- REVIEW YOUR PROJECT MANAGEMENT METHODOLOGY
- ASSESS ADEQUACY OF YOUR CURRENT METHODS
- CONSIDER CORPORATE CULTURE & SYSTEM USERS

Examples of Commercial Project Management Software for Software Developers

Project Workbench
Applied Business Technology Corp.
361 Broadway
New York, NY 10013
(212) 219-8945

MicroMan II
POC-IT Management Services
606 Wilshire Blvd. Suite 512
Santa Monica, CA 90401
(213) 393-4552

Multitrak
Multitrak Software Development Corp
108 Lincoln Street
Boston, MA 02111-2502
(617) 482-6677

Method/1 (Foundation)
Arthur Andersen & Co.
1-800-458-8851

Trends

1. Focus will be on Microcomputer-based Systems.

2. Primary platform will continue to be the PC with DOS & OS/2. Graphical User Interfaces, such as Windows & Presentation Manager will be popular.

3. Additional support for Mac & Unix.

4. High-end systems will strive for Distributed Processing.

5. Distributed Processing will be achieved via Mainframe/Micro platforms, and via PC based File Server protocols.

6. As traditional PMS becomes too sophisticated for moderate & novice users, new (low-end) tools will be developed.

7. Most PMS tools will be designed for general use, but there will be greater availability of applications-oriented products.

The Training/Consulting Connection

The Problem:

1. Ineffective implementation of PMS systems
2. PMS not being used the support project control
3. Project objectives not being met

Causes:

1. Organizational problems
2. Communications problems
3. Training deficiencies

Analysis of Training Deficiency Condition:

1. Training limited to use of the PMS product
2. No training of contributors to the project info flow
3. No training of the receivers/responders of the info
4. Lack of knowledge of PM principles
5. Users weak on PMS communicating techniques

The Solution:

1. Combined consulting & custom training
2. Information gathering, discusions, brainstorming, problem solving
3. Knowledge/training assessment
4. PMS use assessment
5. Communications assessment
6. Results assessment
7. Custom seminar for inputers to the system
8. Development of system outputs
9. Custom seminar for receivers of system outputs

Case History:

Summary:

1. Find out what is wrong
2. Determine weaknesses in system application
3. Improve system operation
4. Indocrinate contributers to the input
5. Indocrinate users of the output

EFFECTIVE SYSTEM IMPLEMENTATION

By Harvey A. Levine

Congratulations! Your company has decided to upgrade its practices and tools employed in managing its projects. You have just made a five-figure investment in several copies of the latest PC-based project management software. You've reviewed your methodology, determined and prioritized your software needs, developed a software-selection specification and reviewed and evaluated several of the short-list products. So you're fairly confident that your choice of Utopian Project Manager VII from Hare Krishna Software Ltd., Bhopal, India, will do the job.

To effectively implement the new system, your company has identified two planning and control gurus and placed them both in the position of Acting Assistant Deputy Project Planning Coordinator. Recognizing that proper user training is essential for effective utilization of project management software, the two gurus were packed off to New Delhi for the vendor's four-day user seminar. But is this training enough to assure effective system implementation? In most cases, the answer is an emphatic no!

TROUBLE IN UTOPIA

There is an almost overwhelming tendency for even well-trained users to experience serious problems in the effective implementation of project management systems. Some request additional training, while others arrange for a consultant to "fix" the problem. However, it's not that simple.

The problem often goes beyond the user's lack of knowledge of project management software. Though there are likely to be some organization and communication problems, many times there is inadequate training provided. Training is often limited to the resident gurus. The other people involved, whether they be contributors to the project information flow or receivers and responders to that information, are often left in the dark. These people, the ones who do the work and make the decisions, have little knowledge of how the system works or how they are to work with the system.

Users must realize that their project management software system is part of a larger system of information flow and response. This system has source groups and target groups that lie outside the immediate purview of the system's operator and the software. The source groups might include the architects and engineers and others associated with the work effort on one or more projects. How can they possibly develop effective data for the project management software system if they have no idea of why the system is there, how it is used and what happens to the information they reluctantly supply in response to the constant hounding of the coordinators? Many times these contributors end up with two, often different, sets of plans: one for themselves and one for the computer.

Among the target groups are project and line managers, senior management, clients and other stakeholders in the project and the company. An effective project management software system must communicate the project plans and status to these stakeholders. When there are project problems, as there are bound to be, the system should point these out, support the analysis and identification of alternatives and promote effective decision making.

But do firms educate their stakeholders for this process? Do firms explain how to read the system output, how to find the "exception" areas, how to identify an out-of-range condition? Do firms establish practices and train these people in the art of "corrective action"? It's doubtful that many, if any, take the steps necessary to train and indoctrinate people at the management levels. Yet without total understanding and support at this level, successful implementation of the project management software system is virtually impossible. What results is a highly structured practice of periodic processing of bad data that is passed out to uninterested and still uninformed managers who do nothing with it.

A solution to this situation involves extending the training to source and target personnel. This would entail customized training, performed on-site, tailored to each firm's specific environment. Perhaps this can best be illustrated by the following case history.

LEARNING BY EXAMPLE

A NASA software developer was using one of the better PC-based project management software products to plan and track a major software/hardware revamp. Several months into the project, it became apparent that the package wasn't doing the job that was expected.

A trainer/consultant was brought in to fix the situation. The client assumed that the problem was primarily associated with unskillful use of the project management software. Making no such assumptions, the consultant started his involvement with a few interviews and three brainstorming sessions. The latter consisted of 1 1/2-hour meetings with about a half-dozen people with varied involvement in the project. The meetings served to unearth many of the problems. Better yet, the dialogues precipitated by the brainstorming sessions

led to immediate resolution of many of the problems, by other participants.

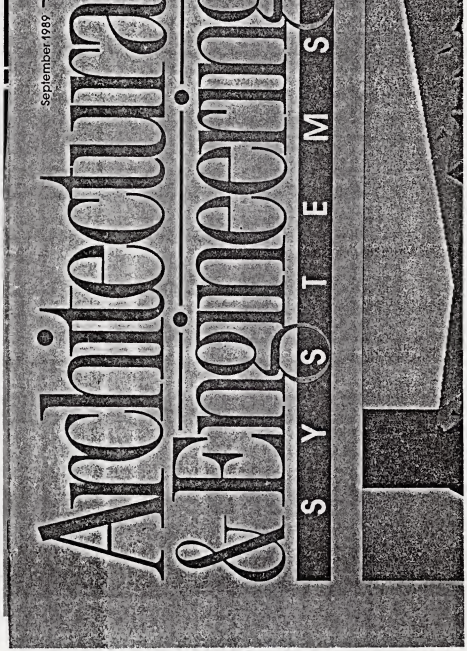
In this case, the consultant immediately found discrepancies in the project as it was viewed by the contributors, and the project as it was modeled in the system. As a result, there were two sets of project plans. Though the "master" plan resided in the computer, the people who were doing the work were essentially working to different plans they kept on a sheet in their desk drawer. At weekly update time, they had to convert their status to the computer plan, and something was always lost in the conversion. The consultant found that the lack of knowledge about what the system did and, especially, what the system did with the plans and data that the contributors provided, was a key factor in solving the problem. Furthermore, the consultant found that the people who received the output from the system did not understand the information on the reports. Nor did they know how to respond to that information.

The solution, in this case, was to prepare two half-day custom seminars. One was aimed at the *contributors*. It started with a presentation of the fundamentals of project management, concentrating on those aspects that were important to them, and addressed the key elements of *their* involvement. It explained what the planners were looking for and what the system did with their data. The seminar used their application as a guide, rather than some inane tutorial model.

For the second seminar, the consultant first worked with the system users to improve the system structure and reports. They identified the stakeholders and the information that each stakeholder required from the system. Then they designed reports that would present the needed information. The recipients of these reports were asked to attend the second custom seminar. There, in addition to the overview on project management, they were briefed on how the system was being used on their project, and how to read the reports. They were directed to the salient features and how to quickly identify an action item or potential problem, and how to use the system to help identify alternatives.

It would be possible to continue, but these are the essential elements of this case history. The operation was a success. The patient lived. And more importantly, the project was successful. Though the application involved the information systems environment, it should not be difficult to recognize its applicability to an AE environment. Both are dealing with the need to maintain effective schedules using limited human resources. Both can achieve this only through effective planning and communication of project status and problems. The implementation of a project management software system is, for most, an essential element of this process. But the full potential of this process cannot be realized unless all of the participants to project success are knowledgeable participants in the process itself. ❑

Harvey A. Levine is past president and chairman of the Project Management Institute and worked in AE operations at General Electric for 24 years. He is currently president of The Project Knowledge Group, a Clifton Park, N.Y., consulting firm specializing in project management software selection, evaluation and training.



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PROJECT MANAGEMENT CREDENTIALS
Harvey A. Levine

Harvey A. Levine is the leading project management software consultant and trainer in the United States & Canada. His understanding of the practical applications of project management software and the needs of users, in all disciplines, has made him a valuable consultant to both the developers and the users of such software. Among his user clients are the leaders in several industries, including: Ford Motor Company, General Electric Company, Singer/Link Flight Simulator, Jet Propulsion Lab, Department of Energy, NYNEX, John Deere, First National Bank of Chicago, U.S. Air Force, Boehringer Ingelheim Pharmaceuticals, Grand Gulf Nuclear Station, Zenith Laboratories, and Schneider Int'l.

Over twenty project management software vendors have called upon Mr. Levine to support product development, marketing, or training activities. These include: Metier Management Systems. Project Software & Development Inc, Primavera Systems, K&H Project Systems, Pertmaster International, Computer Associates, Software Publishing Co., Multitrak Software, ABT, Frontline Systems, Instaplan Corp, Microsoft, Scitor Corp, and Claris.

Mr. Levine is also a frequent contributor to the literature on project management. In addition to his books, he is editor of the PM Software Forum, in the Project Management Journal; and is a regular contributor to Software Magazine, the American Management Association's Project Update, and Architectural & Engineering Systems. He also has written for PC World and Van Nostrand Reinhold, contributes to PC Week, Infoworld, and PC Magazine, and moderates the annual project management panels at PC EXPO.

The success of Mr. Levine's involvement in training and software selection and implementation activities have prompted the following comments from clients that he has helped:

"Mr. Levine's involvement led to a better choice of software and cost savings exceeding $100,000." *(Major Manufacturer)*

"Our new software system wasn't achieving the results that we expected. Mr. Levine helped us to identify what was wrong with our overall project management techniques, and how to make more effective use of the software. Then he conducted customized training to all personnel involved in the project control process. These functions resulted in a complete turnaround in the effectiveness of the project management software and the active involvement of project personnel." *(Software Developer for Space Exploration)*

"Mr. Levine's contribution to the selection of project management software for our engineering operations resulted in expediting the purchase by several months and in an estimated savings of over $15,000." *(Electric Utility)*

"Our program required the effective integration of both project and financial management systems, for use by four prime contractors and for very different types of projects. Mr. Levine helped us to define our project management methodology, narrowed down the field to two suitable products, and provided the information and training necessary for us to make the final choice." *(Aerospace R&D Client)*

Harvey A. Levine, during 27 years of service to the project management profession, has provided Applications, System Design, and Consulting Services in Project Planning & Control, mostly with the General Electric Company. He was instrumental in bringing computerized project management capabilities to over a half dozen divisions of G.E., including the development of project control methodologies, system specifications, system selection, system implementation, user training and management of the project control function.

Mr. Levine served on the Board of Directors of the Project Management Institute, as President and Chairman of the Board of PMI, an international professional society of 6000 members, in 60 countries.

Mr. Levine has been Adjunct Professor of Project Management at Rensselaer Polytechnic Institute, Troy, N.Y., and has conducted lectures, workshops and seminars at dozens of schools, symposia and organizational meetings. Mr. Levine also conducts in-house seminars and does training, consulting, and software selection and evaluation for several corporate clients, and is project management training advisor to PC EXPO.

Mr. Levine is the author of the book "Project Management using Microcomputers", published in 1986 by Osborne/McGraw-Hill. A second book is in progress.

Mr. Levine is the founder and principal of The Project Knowledge Group, 35 Barney Road, Clifton Park, NY 12065, a consulting firm specializing in project management training, project management software selection, evaluation, & implementation, and project management using microcomputers.

Partial Client List

Corporate/User Clients:

Ford Motor Company
Jet Propulsion Lab
John Deere
Singer - Link Flight Simulation Div.
Boehringer Ingelheim Pharmaceuticals
Schneider International
PM Communications
First National Bank of Chicago
General Electric Company
Nynex
U.S. Air Force
Zenith Laboratories
U.S. Dept. of Energy
Henry Ford Health Care Corp.
Grand Gulf Nuclear Station
Energy Absorption
Beall's Dept Stores

PM Software Developers:

Metier Management Systems
Primavera Systems
Project Software & Development, Inc
MultiTrak Software
Pertmaster International
Frontline Systems
Computer Associates
InstaPlan Corp.
Software Publishing Corp
Microsoft Corp.
K&H Project Systems
Scitor Corp.
Cybernetics Index, Inc.
Applied Business Technology Corp.
Shaker Computer & Management Services
LGS Conseillers en Informatique, Inc.
Claris Corp.

Publication & Education Clients:

Software Magazine
PC World
Infoworld
PC Week
McGraw-Hill
Insight
MacMillan Publishing
PC EXPO
Van Nostrand Reinhold
Architectural & Engineering Systems
American Management Association
Center for Professional Advancement
Rensselaer Polytechnic Institute
Clarkson Univ.
Project Management Journal
The Interface Group
American Society of Civil Engineers
Project Management Institute

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PROFILE

Harvey A. Levine has had over 26 years of service to the project management profession, providing applications, system design, and consulting services in project planning and control, mostly with the General Electric Company. From 1962 to 1986, he was instrumental in bringing computerized project management capabilities to over half a dozen divisions of that company, including the development of project control methodologies, system specifications, systems selection, system implementation, user training and management of the project control function.

Mr. Levine recently served on the Board of Directors of the Project Management Institute, as President and Chairman of the Board of PMI, an international professional society of 6000 members in 60 countries.

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Mr. Levine is the author of the book *Project Management Using Microcomputers*, published in 1986 by Osborne/McGraw-Hill. He has written articles for PC World, Software News, Software Magazine, Architectural and Engineering Systems, American Management Association and Insight, and prepared the "Computers in Project Management" chapter for the Project Management Handbook (2nd Ed.) He also writes the P.M. Software Forum, a regular feature in the Project Management Journal. He has been quoted in

over three dozen periodicals during the past two years, and has been featured in articles in Infoworld, PC Week, Personal Computing, Digital Review, and Business Computer Systems. A new book is in progress.

As a leading consultant to the project management software industry, Mr. Levine has provided evaluation, feedback and product development services to two dozen leading vendors. He has contracts with several key vendors for software evaluation, training, and general consulting.

Mr. Levine is the founder and principal of The Project Knowledge Group, 35 Barney Road, Clifton Park, NY 12065, a consulting firm specializing in project management training, project management software selection and evaluation, and project management using microcomputers.